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FURTHER NOTES ON AMERICAN LYCOSIDAE

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PARDOSA C. Koch

It seems clear that Emerton's *Pardosa pallida* is the same as *Lycosa distincta* Blackwall, described from eastern Canada in 1846. The species is one of the dominant forms of the genus in New England and eastern Canada, where it is abundant in grassy meadows. Until recently there were no published records of the species from the West, but it is now known to be common in the Rocky Mountains in suitable situations, usually at elevations between five and eight thousand feet. In Utah both sexes were found associated with females described as *utahensis* by Chamberlin, and these latter were thought only to be variants from the normal. The discovery of an authentic male of *Pardosa utahensis*, however, lends more weight to the value of small differences in the epigynum as an index of specificity and proves erroneous the synonymizing of the name with *distincta* Blackwall (Gertsch, 1934, American Museum Novitates, No. 693, pp. 23-24). In order to facilitate the recognition and separation of these two species, figures are given in this paper. In addition, two other species which have never been illustrated, *Pardosa yavapa* Chamberlin and *P. montgomeryi* Gertsch, quite as closely allied in color pattern and genitalic structure, are figured for comparison.

Pardosa distincta (Blackwall)

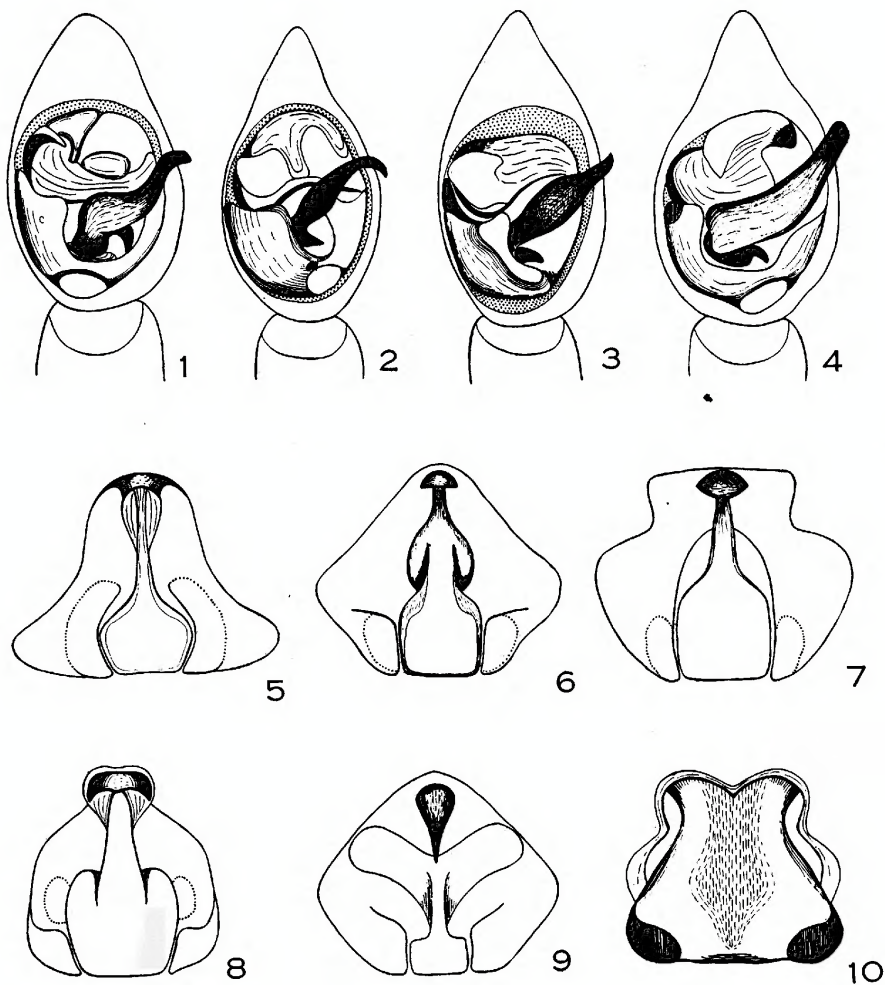
Figures 4 and 8

Lycosa distincta BLACKWALL, 1846, Annals and Magazine Natural History, London, XVII, p. 32.

Pardosa pallida EMERTON, 1885, Trans. Connecticut Acad. Arts and Sciences, VI, p. 496, Pl. XLIX, fig. 3.

Pardosa emertoni CHAMBERLIN, 1904, Canadian Entomologist, XXXVI, p. 175. (New name for *pallida* Emerton, preoccupied.)

DISTRIBUTION.—Eastern Canada. Alberta. New England. Northern Mississippi Basin. Rocky Mountains from Montana to Arizona and New Mexico.



1. *Pardosa montgomeryi* Gertsch, palpus.
2. *Pardosa yavapa* Chamberlin, palpus.
3. *Pardosa utahensis* Chamberlin, palpus.
4. *Pardosa distincta* (Blackwall), palpus.
5. *Pardosa montgomeryi* Gertsch, epigynum.
6. *Pardosa yavapa* Chamberlin, epigynum.
7. *Pardosa utahensis* Chamberlin, epigynum.
8. *Pardosa distincta* (Blackwall), epigynum.
9. *Pardosa yavapa* Chamberlin, abnormal epigynum.
10. *Pardosa andersoni* Gertsch, epigynum.

***Pardosa utahensis* Chamberlin**

Figures 3 and 7

Pardosa utahensis CHAMBERLIN, 1919, Annals Entomological Society of America, XII, p. 258, Pl. XIX, fig. 11.

DISTRIBUTION.—Utah. Colorado. Arizona. New Mexico.

***Pardosa yavapa* Chamberlin**

Figures 2, 6 and 9

Pardosa yavapa CHAMBERLIN, 1925, Bull. Museum of Comparative Zoölogy, LXVIII, pp. 231–232.

Pardosa sanuiana CHAMBERLIN, 1928, Canadian Entomologist, LX, pp. 94–95.

Pardosa orophila GERTSCH, 1933, American Museum Novitates, No. 636, p. 28, fig. 45.

DISTRIBUTION.—Utah. Colorado. Arizona. New Mexico.

***Pardosa montgomeryi* Gertsch**

Figures 1 and 5

Pardosa montgomeryi GERTSCH, 1934, American Museum Novitates, No. 693, pp. 24–25.

DISTRIBUTION.—Texas. New Mexico (Otero County).

Pardosa bellona Banks is typical of another group of species so like each other that difficulty is experienced in their separation. Some of these were discussed by Gertsch in 1934, but no figures were included. It seems to us that *bellona* has been correctly identified and that the two cited records from Utah and Arizona are actually representative of the species. A closely allied species from Texas is described as new in this paper. The study of this group of five species has convinced us that it would be safer to withhold the synonymizing of *Pardosa pauxilla* Montgomery with *uncatula* Cambridge until comparison can be made with authentic Mexican examples of the latter species.

***Pardosa bellona* Banks**

Figure 14

Pardosa bellona BANKS, 1898, Proc. California Academy of Sciences, (3) I, p. 275, Pl. XVI, fig. 21.

DISTRIBUTION.—Mexico. Utah. Arizona.

***Pardosa delicata* Gertsch**

Figure 18

Pardosa delicata GERTSCH, 1934, American Museum Novitates, No. 693, pp. 20–21.

DISTRIBUTION.—La Zacualpa, Chiapas, Mexico.

***Pardosa delicatula*, new species**

Figures 13 and 17

MALE.—Total length, 4.50 mm. Carapace, 2.60 mm. long, 1.90 mm. wide.

Carapace yellowish brown, the sides with a narrow marginal black seam, usually made up of spots, the dorsum with two longitudinal black stripes that may be nearly confluent or that may be well separated to leave an irregular median pale stripe that goes forward to the last eye row. Sides with a submarginal light band that runs to the sides of the head and includes the clypeus. Eye region black. Sternum pale yellowish-brown, margined in black or sometimes with two median stripes. Legs strongly annulate on a pale base. Palpus thickly clothed with black hairs. Dorsum of abdomen gray to black, with an irregular pale longitudinal band made up of spots or in dark specimens with only a light basal hastate maculation. Venter light yellow.

Eyes of the first row slightly procurved, the larger medians separated by a radius, half as far from the laterals. Clypeus twice as high as the diameter of an anterior median eye. Second row of eyes broader than the first (35/22), separated by scarcely a diameter, farther from the eyes of the third row (15/11). Posterior eyes separated by three diameters, smaller than the eyes of the second row (10/14). Dorsal eye quadrangle broader than long (43/30), narrowed in front. Head portion broad, the width at the posterior eye row being two-thirds the greatest width. Sternum longer than broad (6/5). Lower margin of the furrow of the chelicera with three teeth. Palpus, figure 13.

Legs, 4123, the first tibiae with a basal and submedian pair of strong spines and a weak distal pair.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	1.75	0.80	1.61	1.70	1.10	6.96 mm.
II	1.75	0.80	1.50	1.70	1.05	6.80 mm.
III	1.75	0.80	1.40	1.82	0.95	6.72 mm.
IV	2.40	0.90	2.10	3.10	1.30	9.80 mm.

FEMALE.—Total length, 4.75 mm. Carapace, 2.60 mm. long, 1.85 mm. wide.

Structure essentially as in the male. Color usually much lighter but the pattern is in complete agreement with light-colored males. The epigynum (Fig. 17) is closely related to other species of the group and is best separated by a comparison of figures. The proportions of the median apophysis of the palpus in the male will separate it from *bellona*.

TYPE LOCALITY.—Male holotype, female allotype, and numerous paratypes of both sexes from Edinburg, Texas, collected by Mr. Stanley Mulaik, in the collection of The American Museum of Natural History.

***Pardosa pauxilla* Montgomery**

Figures 11 and 15

Pardosa pauxilla MONTGOMERY, 1904, Proc. Acad. Nat. Sci. Philadelphia, p. 268, Pl. XIX, figs. 22 and 23.

DISTRIBUTION.—Texas. Oklahoma.

***Pardosa milvina* (Hentz)**

Figures 19 and 20

Lycosa milvina HENTZ, 1844, Jour. Boston Soc. Nat. Hist., IV, p. 392, Pl. xviii, fig. 8.

DISTRIBUTION.—Canada. Eastern United States.

***Pardosa floridana* Banks**

Figures 12 and 16

Pardosa littoralis BANKS, 1896, Journal New York Entomological Society, IV, p. 192.

Pardosa floridana BANKS, 1904, Proc. Acad. Nat. Sci. Philadelphia, p. 136, Pl. VII, fig. 1, Pl. VIII, fig. 15.

Pardosa banksi CHAMBERLIN, 1904, Canadian Entomologist, XXXVI, p. 175. (New name for *littoralis* Banks, preoccupied.)

DISTRIBUTION.—Long Island, New York to Florida. Cuba.

ARCTOSA C. Koch***Arctosa trifida* F. Cambridge**

Arctosa trifida F. CAMBRIDGE, 1902, 'Biologia Centrali-Americana,' Araneidea, II, p. 330, Pl. xxxi, figs. 24 and 25.

DISTRIBUTION.—Mexico. Southern Texas.

This species is closely allied to *Arctosa littoralis* (Hentz) but differs in the details of the median apophysis of the bulb of the palpus and in having the tibia and patella of the fourth leg as long as, but not longer than, the length of the carapace.

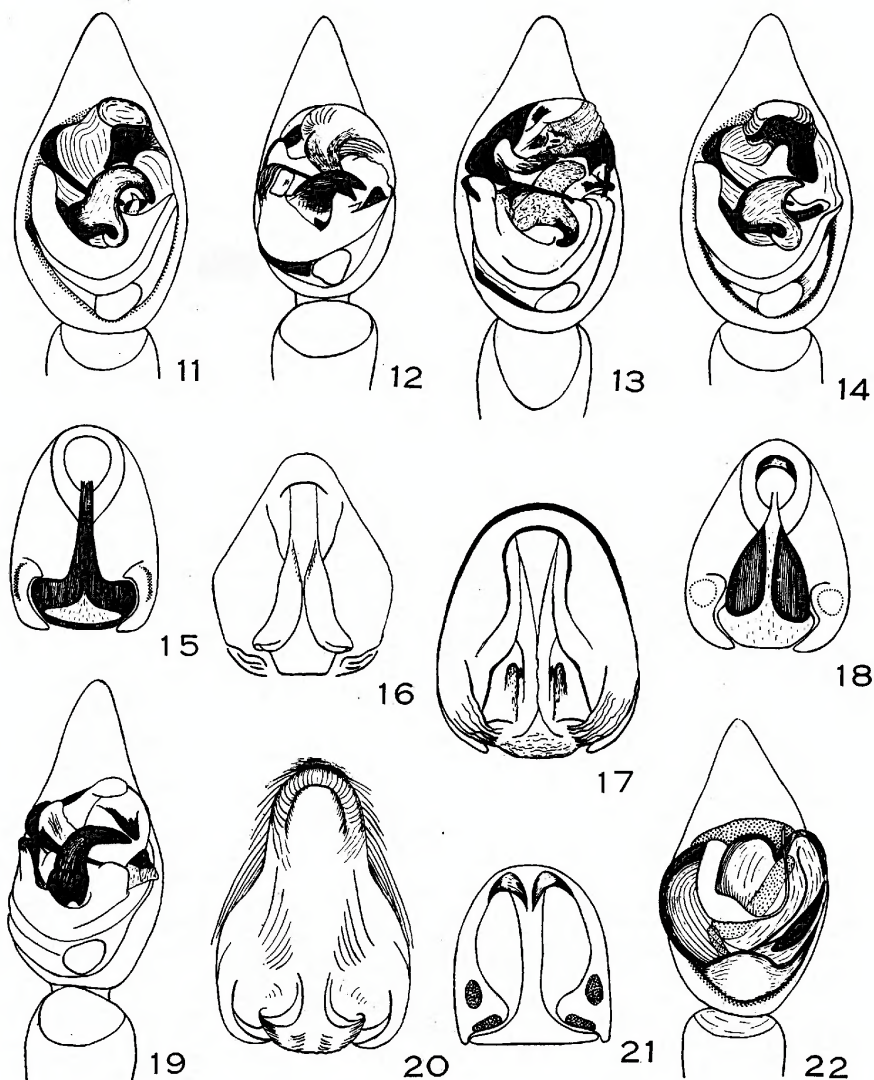
***Arctosa sanctae-rosae*, new species**

Figures 23 and 24

MALE.—Total length, 9.8 mm., not including the spinnerets.

Color of legs and body mainly ivory-white. Abdomen snow-white, flocculent in appearance, the dorsum with a darker basal hastate maculation, the venter somewhat lighter than the sides. Metatarsi and tarsi of legs I and II pale brown, the claws black. Chelicerae and tarsi of the palpi faintly brown. Spines of the legs and claws of the chelicerae dark brown. Posterior eyes incompletely surrounded by a black area, which extends between the eyes of the second row. Scopulae on the anterior margin of the labium, on the endites, and on the furrow of the chelicerae dark brown.

Carapace longer than broad (5.50 mm./4.00 mm.), moderately high (3.00 mm.). Posterior eye quadrangle wider than long (19/14), the anterior eyes slightly larger than the posteriors. Anterior row of eyes narrower than the second row (10/15), straight, the medians nearly twice as large as the laterals, the medians closer to the laterals than to each other. Clypeus about half as high as the diameter of an anterior lateral eye. Chelicerae 2.60 mm. long, exclusive of the claw, 2.10 mm. wide immediately below the clypeus. Lower margin of the furrow of the chelicerae armed with



11. *Pardosa pauxilla* Montgomery, palpus.
12. *Pardosa floridana* Banks, palpus.
13. *Pardosa delicatula*, new species, palpus.
14. *Pardosa bellona* Banks, palpus.
15. *Pardosa pauxilla* Montgomery, epigynum.
16. *Pardosa floridana* Banks, epigynum.
17. *Pardosa delicatula*, new species, epigynum.
18. *Pardosa delicata* Gertsch, epigynum.
19. *Pardosa milvina* (Hentz), palpus.
20. *Pardosa milvina* (Hentz), epigynum.
21. *Schizocosa unica*, new species, epigynum.
22. *Schizocosa unica*, new species, palpus.

three medium-sized teeth, equal in size and equally spaced, the upper margin with three unequal teeth, unequally spaced, the median the largest. Labium slightly longer than broad. Sternum longer than wide (2.80 mm./2.20 mm.). Palpus, figure 23. Anterior spinnerets slightly more than twice as long as the posterior pair, the terminal joint of the anterior pair 0.70 mm. long, the basal joint 0.20 mm. long.

Legs, 4321, all tibiae armed beneath with three pairs of spines, the distal pair apical, less than half as long as the proximal and middle pairs, the middle pair nearer the proximal than the distal pair. All tibiae armed above with a single spine near the middle. Basal spines on the tibiae above replaced by long, hairlike bristles. Femora armed with spines above. Tibia and patella I, 5.80 mm. long, IV, 6.60 mm. long.

FEMALE.—Total length, 10.60 mm., not including the spinnerets.

Color of the legs and body the same as in the male except that the metatarsi and tarsi of legs I and II and the tarsi of the palpi are lighter.

Carapace longer than broad (4.80 mm./3.20 mm.), moderately high (2.60 mm.). Dorsal eye quadrangle wider than long (17/13), the anterior eyes slightly larger than the posteriors. Anterior row of eyes narrower than the second row (10/13), straight, the medians about twice as large as the laterals, the medians closer to the laterals than to each other. Clypeus scarcely as high as the diameter of an anterior lateral eye. Chelicerae, 2.30 mm. long, exclusive of the claw, 1.90 mm. wide immediately below the clypeus. Lower margin of the furrow of the chelicerae armed with three medium-sized teeth, equal in size and equally spaced, the upper margin with three unequal teeth, unequally spaced, the median the largest. Labium slightly longer than wide. Sternum longer than wide (22/18). Epigynum comparatively small, 0.50 mm. wide, figure 24. Anterior spinnerets slightly more than twice as long as the posterior pair, the terminal joint of the anterior pair 0.70 mm. long, the basal joint 0.30 mm. long.

Legs, 4321, the spines similar to those of the male. Tibia and patella I, 4.50 mm. long, IV, 5.60 mm. long.

TYPE LOCALITY.—Male holotype, female allotype and paratypes of both sexes from Santa Rosa Island, Pensacola, Florida, taken April 5, 1934, by H. K. Wallace, the types in the collection of The American Museum of Natural History, some of the paratypes in the collection of H. K. Wallace.

This fine species can be confused with no other from the United States. Some specimens of *Arctosa littoralis* (Hentz) might conceivably approach the ivory-white color of this species, but they can then be separated by the shorter legs and the distinctive trifid median apophysis of the palpus.

PIRATA Sundevall

***Pirata seminola*, new species**

Figures 33 and 35

FEMALE.—Total length, 3.40 mm. Carapace, 1.75 mm. long, 1.20 mm. wide.

Carapace black, the sides with a submarginal light stripe and a narrow marginal black seam, the dorsum with the conventional Y-shaped light marking, the stem por-

tion of the figure going to the caudal margin. Sternum yellowish brown, narrowly margined in black. Labium, endites and coxae yellowish brown. Legs strongly annulate in black on a yellowish base. Dorsum of abdomen mostly black, with a basal lighter hastate maculation and small white spots in the caudal half. Sides of the abdomen concolorous with the dorsum, the venter paler, with an irregular median black stripe.

First row of eyes as broad as the second, very weakly procurved, the larger medians (14/9) separated by their radius, subcontiguous or scarcely separated from the laterals. Eyes of the second row narrower than the third in the ratio 57:77, separated by more than half a diameter (17/23), about one diameter from the posterior eyes, which are separated by three diameters and are somewhat smaller than the laterals (19/23). Dorsal ocular quadrangle broader than long (77/50), narrower in front. Clypeus as high as the diameter of an anterior lateral eye. Second row of eyes seven-tenths of the width of the carapace at that point. Lower margin of the furrow of the chelicera with three subequal teeth. Sternum longer than broad (6/5). Epigynum, figure 33.

Legs, 4123, the tibiae of the first two legs with two ventral pairs and a single spine on the prolateral side, the distals lacking. Last tibia above with a basal and submedian spine.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	1.10	0.50	0.87	0.85	0.42	3.74 mm.
II	1.00	0.50	0.75	0.80	0.40	3.45 mm.
III	1.00	0.45	0.65	0.82	0.37	3.29 mm.
IV	1.35	0.55	1.20	1.40	0.60	5.10 mm.

MALE.—Total length, 3.25 mm. Carapace, 1.80 mm. long, 1.25 mm. wide.

Color and structure essentially as in the female. Male palpus (Fig. 35) very similar to that of *Pirata minuta* Emerton but with the median apophysis proportionately larger.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	1.15	0.55	1.00	1.05	0.50	4.25 mm.
II	1.15	0.55	0.87	0.87	0.47	3.91 mm.
III	1.12	0.42	0.65	0.95	0.40	3.54 mm.
IV	1.50	0.60	1.25	1.50	0.60	5.45 mm.

TYPE LOCALITY.—Male holotype, female allotype, and paratypes from Levy Lake, Florida, March 14, 1934 (H. K. Wallace). Female paratype from Spring Creek, Lake County, Florida, November 4, 1933 (H. K. Wallace). Types in the collection of The American Museum of Natural History.

This small species differs from *Pirata minuta* Emerton in having distinct submarginal pale bands on the carapace, banded legs, and in the comparatively broader pars cephalica.

***Pirata alachua*, new species**

Figures 34 and 36

FEMALE.—Total length, 4.00 mm. Carapace, 2.10 mm., long, 1.50 mm. wide.

Carapace light yellowish-brown, the sides with a broad, light marginal band, the dorsum with the conventional Y-shaped light marking, the intervals between the light stripes infuscated. Most of eye region black. Sternum, mouth parts and coxae yellowish brown. Legs slightly infuscated, without bands or markings. Dorsum of abdomen with a basal hastate light marking and several light spots, otherwise gray, the venter pale yellowish-brown.

First row of eyes six-sevenths as broad as the second, very weakly procurved, the medians separated by a radius, half as far from the smaller laterals. Second row of eyes three-fourths as wide as the posterior row, which are separated by scarcely three diameters and are smaller than the eyes of the second row in the ratio 11:15. Dorsal quadrangle broader than long (103/75), narrowed in front in the same ratio. Posterior eye row narrower than the width of the carapace at that point (10/13). Clypeus equal in height to the diameter of an anterior lateral eye. Sternum longer than broad (15/12). Lower margin of the furrow of the chelicera with three subequal teeth. Epigynum, figure 34.

Legs, 4123, the first tibia with two pairs and a single spine beneath. Last tibia with a basal and submedian dorsal spine.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	1.60	0.67	1.32	1.25	0.50	5.34 mm.
II	1.40	0.64	1.15	1.15	0.50	4.84 mm.
III	1.25	0.55	1.00	1.30	0.50	4.60 mm.
IV	2.00	0.75	1.75	2.25	0.75	7.50 mm.

MALE.—Total length, 3.25 mm. Coloration and structure essentially as in the female. Palpus, figure 36.

TYPE LOCALITY.—Male holotype, female allotype and paratype from Alachua County, Florida, March 23, 1934 (H. K. Wallace). Paratypes from Levy Lake, Florida, March 14, 1934 (H. K. Wallace). Types in the collection of The American Museum of Natural History.

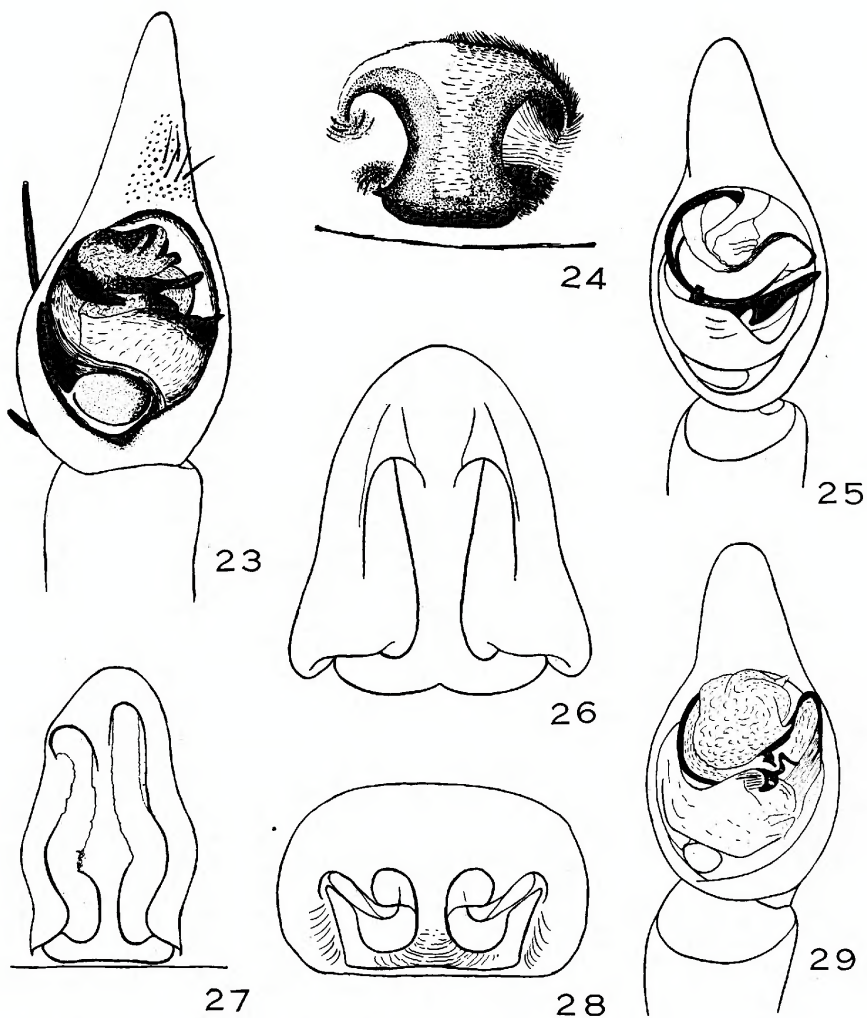
The species is related to *Pirata arenicola* Emerton but differs from it in the details of the palpus and epigynum as figured.

SCHIZOCOSA Chamberlin***Schizocosa unica*, new species**

Figures 21 and 22

MALE.—Total length, 4.00 mm. Carapace, 2.10 mm. long, 1.40 mm. wide.

Carapace dark brown to black, darkest on the sides and in the eye region, the sides clothed with inconspicuous black hairs, the midline paler and clothed with a conspicuous longitudinal band of long white hairs which runs the length of the carapace and is nearly as wide as the interval between the posterior eyes. Sternum, mouth parts and coxae shiny, dark brown, sparsely clothed with fine, erect black hairs. Legs concolorous with the carapace except the tarsi which are yellowish



23. *Arctosa sanctae-rosae*, new species, palp.
 24. *Arctosa sanctae-rosae*, new species, epigynum.
 25. *Lycosa antelucana* Montgomery, palp.
 26. *Lycosa antelucana* Montgomery, epigynum.
 27. *Lycosa ceratiola*, new species, epigynum.
 28. *Lycosa parthenus* Chamberlin, epigynum.
 29. *Lycosa parthenus* Chamberlin, palp.

brown. All the leg joints clothed with black hairs and long spines. Dorsum of abdomen and the sides dark brown, variegated somewhat with white markings, clothed with white pubescence, the hairs of which are longer and more conspicuous on the midline. Venter yellowish brown.

Carapace much longer than broad, the head portion more than half (7/10) as wide as the greatest width. First row of eyes moderately procurved, the medians separated by two-thirds their diameter, a radius from the slightly larger lateral eyes. Eyes of the second row broader than the first (11/8), narrower than the posterior row of eyes (11/13), separated by two-thirds their diameter, fully a diameter from the posterior eyes, which are separated by two and one-half times their diameter. Dorsal quadrangle broader than long (13/11), slightly narrowed in front, the anterior eyes larger (10/7). Clypeus about as high as the diameter of an anterior median eye. Chelicerae with two subequal teeth on the lower margin, three unequal ones on the upper. Sternum longer than broad (20/17). Labium broader than long (6/5), half as high as the endites. Male palpus, figure 22.

Legs, 4123, the tibiae armed with three pairs of ventral spines, the last pair apical, the first two tibiae unarmed above, the last two with a basal and a submedian spine.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	1.40	0.70	1.07	1.15	0.85	5.17 mm.
II	1.25	0.62	0.95	1.07	0.80	4.69 mm.
III	1.17	0.57	0.80	1.12	0.72	4.38 mm.
IV	1.70	0.75	1.37	1.95	1.05	6.82 mm.

FEMALE.—Total length, 5.90 mm. Carapace, 2.50 mm. long, 1.65 mm. wide.

Color and structure essentially as in the male. Sternum longer than broad (9/7). Labium slightly broader than long. Chelicerae with two subequal teeth on the lower margin. Epigynum, figure 21.

TYPE LOCALITY.—Male holotype and female allotype from Hope, New Mexico, July 5, 1934 (S. Mulaik). Female paratype from Jeff Davis County, Texas, July, in the collection of Mr. Mulaik. Types in the collection of The American Museum of Natural History.

This small species, though belonging clearly with the Lycosinae, has the labium distinctly broader than long as in *Pardosa* and allied genera. The presence of two teeth on the lower margin will separate it from species of all genera but *Tarentula*. From the species of that genus it differs in the lateral position of the scopus. This species will no doubt be the type of a new genus, but further study of exotic genera must be made to give it a proper position among the known genera of the family.

LYCOSA Latreille

Lycosa acompa Chamberlin

Figure 31

Lycosa acompa CHAMBERLIN, 1924, Proc. U. S. National Museum, LXIII, p. 29, Pl. VI, fig. 45.

MALE.—Total length, 6.10 mm.

Carapace grayish brown on the sides, with a wide median dorsal stripe, yellow in color and with indistinct margins, which ends between the eyes of the second and

third rows. Eye area black. Sides with an indistinct submarginal light band. Carapace sparsely pubescent, with a smooth and shining surface. Sides of the abdomen with deep red and black pubescence, the dorsum lighter in front. Legs yellow, not annulated. Coxae and endites yellow, the labium darker. Sternum with a slight reddish cast. Chelicerae reddish brown, with black pubescence. Venter almost black, with a reddish cast and no definite markings, dark in front of the epigastric furrow.

Carapace longer than broad (3.40 mm./2.70 mm.), rather low (1.80 mm.). Width of the face 1.60 mm. Dorsal eye quadrangle wider than long (10/8), the anterior eyes larger than the posteriors. Anterior row of eyes somewhat narrower than the second row (7/8), slightly procurved, the medians about twice as large as the laterals, the anterior medians and laterals about equally spaced. Clypeus not quite as high as the diameter of an anterior median eye. Chelicerae, 1.30 mm. long, exclusive of the claw, 1.50 mm. wide. Lower margin of the furrow of the chelicera armed with three small teeth, equal in size and equidistantly spaced, the upper margin with three unequal teeth, unequally spaced, the median the largest. Labium as long as broad. Sternum longer than broad (17/14). Palpus, figure 31.

Legs, 4123, all tibiae armed beneath with three pairs of spines, those of legs III and IV relatively longer, the distal pair apical. Tibiae III and IV armed above with proximal and submedian spines. Femora armed above.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	2.50	1.30	2.10	2.00	1.40	9.30 mm.
II	2.30	1.20	1.80	1.80	1.40	8.50 mm.
III	2.20	1.10	1.50	2.00	1.30	8.10 mm.
IV	2.29	1.30	2.30	3.10	1.70	11.30 mm.

RECORDS.—Escambia County, Florida, April 6, 1934, male and female (H. K. Wallace). Edinburg, Texas, male, females (S. Mulaik).

***Lycosa parthenus* Chamberlin**

Figures 28 and 29

Lycosa parthenus CHAMBERLIN, 1925, Bull. Museum of Comparative Zoölogy, LXVII, p. 228.

MALE.—Total length, 7.20 mm., not including the spinnerets.

Carapace yellowish brown, the sides with black pubescence, the median dorsal stripe wide, yellow, widest about the length of the posterior quadrangle behind the third eye row, gradually narrowing from that point to the posterior margin of the carapace, narrowing more abruptly anteriorly, ending between the eyes of the second and third row. Pale stripe enclosing at its widest point two short, parallel, longitudinal dark marks. Submarginal yellow bands distinct, the margins of the carapace black. Eyes incompletely surrounded by black. Dorsum of abdomen reddish brown, with a black maculation of no definite pattern, lighter in front, the anterolateral margins black. Venter light yellow, with a few dark spots, lighter in front of the epigastric furrow. Sternum, labium and endites almost white, cream-colored. Chelicerae light, amber-colored. Coxae and legs yellow, indistinctly ringed in black.

Carapace longer than broad (4.00 mm./2.90 mm.), rather low (1.90 mm.). Width of the face, 1.60 mm. Posterior quadrangle wider than long, in the ratio 10:8, the anterior eyes larger than the eyes of the last row. Anterior row of eyes somewhat

narrower than the second row (7/8), slightly procurved, the medians about twice as large as the laterals, equally spaced. Clypeus not quite as high as the diameter of an anterior median eye. Chelicerae 1.40 mm. long, exclusive of the claw, tapering evenly from their bases distally. Lower margin of the furrow of the chelicerae armed with three medium-sized teeth, equal in size and equally spaced, the upper margin with three unequal teeth, unequally spaced, the median the largest. Labium as long as broad, the basal excavations short. Sternum longer than broad (18/14). Palpus, figure 29. Anterior spinnerets about twice as long and stouter than the posteriors.

Legs, 4123, the second and third subequal. All tibiae armed beneath with three pairs of spines, the distal pairs apical, the spines of legs III and IV relatively longer, the proximal pairs of legs I and two overlapping the middle pairs, the proximal and middle pairs of legs III and IV overlapping the middle and distal pairs respectively. Tibiae III and IV armed above with proximal and submedian spines.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	2.70	1.50	2.20	2.20	1.50	10.10 mm.
II	2.50	1.40	2.00	2.10	1.40	9.40 mm.
III	2.40	1.30	1.80	2.40	1.40	9.30 mm.
IV	3.20	1.40	2.60	3.80	1.80	12.80 mm.

FEMALE.—Epigynum, figure 28.

RECORDS.—Numerous specimens from Alachua County, Lake County, Escambia County, and Levy County, Florida (H. K. Wallace).

Lycosa antelucana Montgomery

Figures 25 and 26

Lycosa antelucana MONTGOMERY, 1904, Proc. Acad. Nat. Sci. Philadelphia, XVIII, p. 282, Figs. 5 and 6.

Lycosa apicata BANKS, 1904, Journal New York Entomological Society, XII, p. 114, Pl. v, fig. 13.

DISTRIBUTION.—Southern United States from Florida (Santa Rosa Island, Pensacola) to Texas, north to Kentucky (Bowling Green), and known in the west from Arizona, Utah, and California.

Since the figures given by Montgomery of the palpus and epigynum of this species are not satisfactory, additional illustrations are presented in this paper.

Lycosa ceratiola, new species

Figure 27

FEMALE.—Total length, 15.20 mm., not including the spinnerets.

Carapace with a wide, yellow, longitudinal area covered with white pubescence. Sides dark, the ground color reddish yellow, clothed with black pubescence. Median dorsal stripe narrow, reddish yellow, widening abruptly about the diameter of a posterior lateral eye in front of the dorsal groove, but covered with black pubescence in such a way as to obscure this widening. As a result, the median dorsal stripe appears to end about midway between where it widens and the posterior lateral eyes.

Eye area covered with white pubescence which extends between the posterior median eyes to the anterior row in a narrow band. Eyes incompletely surrounded by black. Dorsum of the abdomen grayish white, almost without markings of any kind, covered with sparse black pubescence and short black bristles. A hastate mark and four black spots are faintly indicated. Legs light yellow beneath, darker above, the metatarsi and tarsi of legs I and II reddish brown, the femora above with faint indications of black rings. Patellae dark proximally and on the sides. Venter, coxae, sternum, labium, chelicerae and endites black. Abdomen dark in front of the epigynum. Anterior spinnerets twice as long and stouter than the posteriors.

Carapace longer than broad (7.50 mm./5.70 mm.), 4.60 mm. high. Width of the face 3.70 mm. Posterior eye quadrangle wider than long (24/20), the anterior eyes larger than the posteriors (9/8). Anterior row of eyes distinctly shorter than the second row (16/21), almost straight (a line passing through the centers of the anterior median eyes goes slightly above the centers of the laterals), the medians about twice as large as the laterals, the eyes of the row about equally spaced. Clypeus about three-fourths as high as the diameter of an anterior median eye. Chelicerae 3.50 mm. long, exclusive of the claw, 3.30 mm. wide. Lower margin of the furrow of the chelicerae armed with three median-sized teeth, equal in size and equally spaced, the upper margin with three unequal teeth, unequally spaced, the median one distinctly larger than any of the other teeth on either furrow. Labium as long as broad. Sternum longer than broad (20/27).

Legs, 4123, all the tibiae armed beneath with three pairs of spines, the last pair apical, the proximal and middle pairs of legs I and II very much reduced, not as large as the apical pairs. Tibiae III and IV armed above with a proximal and middle spine.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	6.40	3.20	5.10	4.70	2.90	22.30 mm.
II	6.10	3.10	4.90	4.80	3.00	21.90 mm.
III	5.60	2.60	4.30	5.20	3.40	21.10 mm.
IV	6.80	3.00	5.90	7.60	4.20	27.50 mm.

TYPE LOCALITY.—Female holotype and immature paratypes from Lake County, Florida, January 4, 1935 (H. K. Wallace), the holotype in the collection of The American Museum of Natural History, some of the immature paratypes in the collection of Mr. H. K. Wallace.

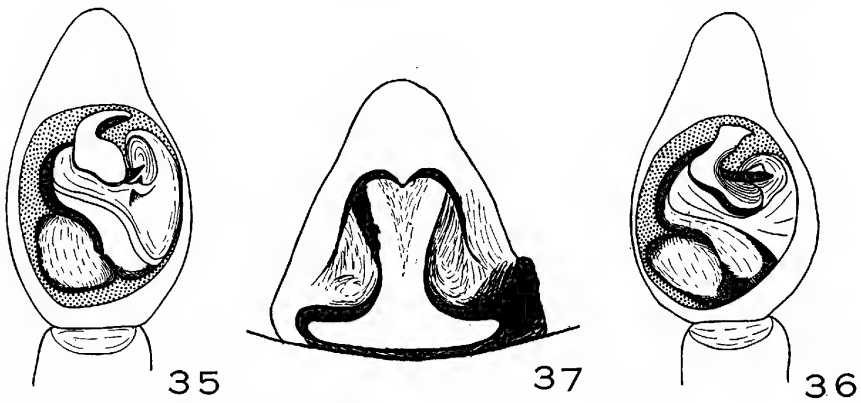
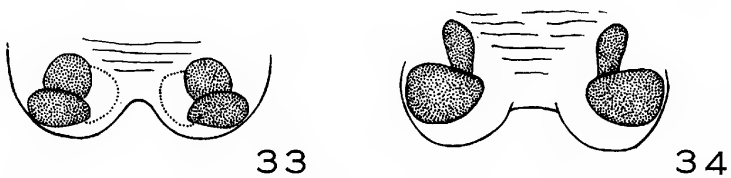
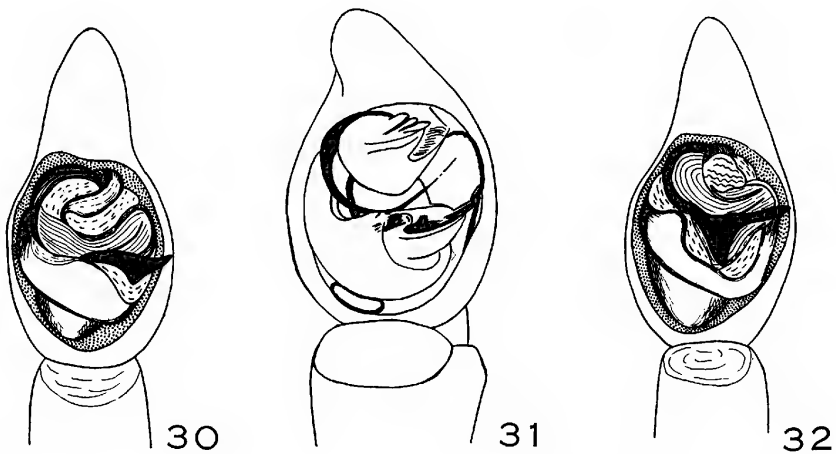
This species looks very much like *Lycosa lenta* Hentz, and they occur together, but *ceratiola* is distinct in the epigynum and in the much reduced spines beneath the first and second tibiae. Only one mature female has been collected to date, but numerous specimens of immature males and females have been taken in the dry sandy area, locally known as the "Ocala Scrub," about seventeen miles east of Umatilla, Florida.

***Lycosa tigana*, new species**

Figure 32

MALE.—Total length, 10.66 mm. Carapace, 4.66 mm. long, 3.80 mm. wide.

Carapace with a median longitudinal yellowish-brown band which begins between the four dorsal eyes, enlarges immediately behind to nearly the width of the last row of eyes, is constricted abruptly at the midline, enlarges again to the end of the



30. *Lycosa retenta*, new species, palpus.
31. *Lycosa acompa* Chamberlin, palpus.
32. *Lycosa tigana*, new species, palpus.
33. *Pirata seminola*, new species, epigynum.
34. *Pirata alachua*, new species, epigynum.
35. *Pirata seminola*, new species, palpus.
36. *Pirata alachua*, new species, palpus.
37. *Lycosa carrana* Bryant, epigynum.

median suture, at which point it narrows to a third the greatest width, and then goes to the caudal margin. Sides with an irregular submarginal light-brown band that includes the sides of the head and the clypeus and a darker narrow marginal seam. Eyes surrounded by black. The intervals between the pale bands form two irregular brown stripes, which are clothed with fine black hairs. Sternum and coxae pale yellow, the pubescence light in color. Chelicerae dark brown, clothed with white hairs. Labium dark brown, the endites somewhat lighter. Legs light brown, without bands but with irregular dark markings on the basal joints. Dorsum of abdomen gray, with a dark basal hastate maculation and a few irregular dark markings in the caudal half. Venter gray, with a characteristic black, rather small, triangular marking which begins and is broadest at the genital furrow and then is gradually narrowed to a blunt point well in front of the spinnerets, the maculation occupying only the middle portion of the venter, not completely filling at as in *baltimoriana* or *coloradensis*.

First row of eyes nine-tenths as broad as the second, procurved, the medians separated by a radius, half as far from the laterals, which are about two-thirds as large. Eyes of the second row five-sixths as broad as the posterior row, separated by more than half their diameter (7/11), a little farther from the eyes of the third row (8/11). Posterior eyes separated by two diameters, smaller than the eyes of the second row (8/11). Quadrangle of dorsal eyes broader than long (31/23), narrowed in front. Clypeus as high as the diameter of an anterior lateral eye. Lower margin of the furrow of the chelicera with three teeth, the one nearest the claw smaller, the upper margin with three teeth of which the median is much larger. Sternum longer than broad (16/13). Labium longer than broad (6/5). Palpus, figure 32.

Legs, 4123. All tibiae with three pairs of stout ventral spines, the last pair apical. First and second tibiae with a single submedian dorsal spine, the third and fourth tibiae with an additional stout basal spine.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	4.46	2.24	3.80	3.80	2.30	16.60 mm.
II	4.14	2.00	3.44	3.95	2.17	15.70 mm.
III	4.14	1.80	3.18	4.14	2.27	15.53 mm.
IV	4.84	2.27	4.34	5.70	3.04	20.19 mm.

TYPE LOCALITY.—Male holotype and paratype from Edinburg, Texas (S. Mulaik), in the collection of The American Museum of Natural History.

This species is immediately separable from *Lycosa lenta* and *baltimoriana* by the much smaller size and the greatly reduced black maculation on the venter of the abdomen. In these species the sternum and coxae are black; in the latter species the legs are annulate. The palpus places *Lycosa tigana* near these species but differs in details as shown in the figure. *Lycosa antelucana* Montgomery, closely allied to the species mentioned, has the last leg annulate as in *baltimoriana* and often has the venter of the abdomen and the sternum and coxae completely suffused with black. The median apophysis of that species, however, is of quite a

different form. The palpus of *Lycosa tigana* is very close to that of *Lycosa fusca* Keyserling, a West Indian form, but the median apophysis is distinctly larger and has a more conspicuous caudal lobe.

***Lycosa retenta*, new species**

Figure 30

MALE.—Total length, 12.50 mm. Carapace, 6.00 mm. long, 4.60 mm. wide.

Carapace with a median longitudinal light-brown band as wide as the interval between the posterior eyes, slightly narrowed at the caudal margin, in front extending between the dorsal eyes. Sides brown, without a distinct submarginal light band. Eyes ringed in black, partially covered with white hairs. Carapace evenly covered with fine hairs that agree in color with the chromatism. Sternum, mouth parts, and coxae light brown, sparsely clothed with fine hairs. Legs light brown in color, without markings, rather thickly clothed with white pubescence and black hairs. Dorsum of the abdomen yellowish brown, with a basal dark-brown hastate maculation and dark side markings forming indistinct longitudinal stripes. Venter with a dark-brown maculation just behind the genital furrow, otherwise pale brown. Spinnerets brown.

First row of eyes five-eighths as broad as the second, slightly procurved, the medians separated by a radius, scarcely as far from the laterals, which are two-thirds as large. Second row of eyes eight-ninths as broad as the posterior rows, two-thirds their diameter apart, one diameter from the posterior eyes. Posterior eyes scarcely two diameters apart, smaller than the eyes of the second row (8/9). Dorsal eye quadrangle scarcely broader than long (25/24), slightly narrowed in front. Clypeus equal in height to the diameter of an anterior lateral eye. Lower margin of the furrow of the chelicera with three subequal teeth, the upper margin with three unequal teeth, the median one the largest. Sternum longer than broad (21/17). Labium longer than broad (10/9). Palpus, figure 30.

Legs, 4123, all tibiae with three pairs of stout ventral spines, the last pair apical, and with a single basal and submedian dorsal spines.

	FEMUR	PATELLA	TIBIA	METATARSUS	TARSUS	TOTAL
I	5.32	2.32	4.66	5.32	2.40	20.02 mm.
II	5.00	2.32	4.40	5.12	2.35	19.19 mm.
III	4.66	2.20	4.00	5.32	2.35	18.53 mm.
IV	6.00	2.50	5.04	7.12	2.84	23.50 mm.

TYPE LOCALITY.—Male holotype and immature female allotype from Austin, Texas (J. H. Montgomery), in the collection of The American Museum of Natural History.

This species is not closely allied to *Lycosa coloradensis* Banks, with which it agrees somewhat in color markings. Banks' species is much more robust, has the quadrangle of the dorsal eyes proportionately much broader than long, and has no dorsal spines on the first two tibiae. In addition, *Lycosa coloradensis*, which is a burrower, has distinct dark annulae on the legs. The palpus would seem to place *Lycosa retenta*

near the group of species of which *Lycosa antelucana* and *Lycosa lenta* are representatives, but from these species it differs in the much narrower pars cephalica and in the distinctive color markings, which in this group are of prime importance in placing the species.

***Lycosa carrana* Bryant**

Figure 37

Lycosa carrana BRYANT, 1934, Psyche, XLI, pp. 38-39, Fig. 1.

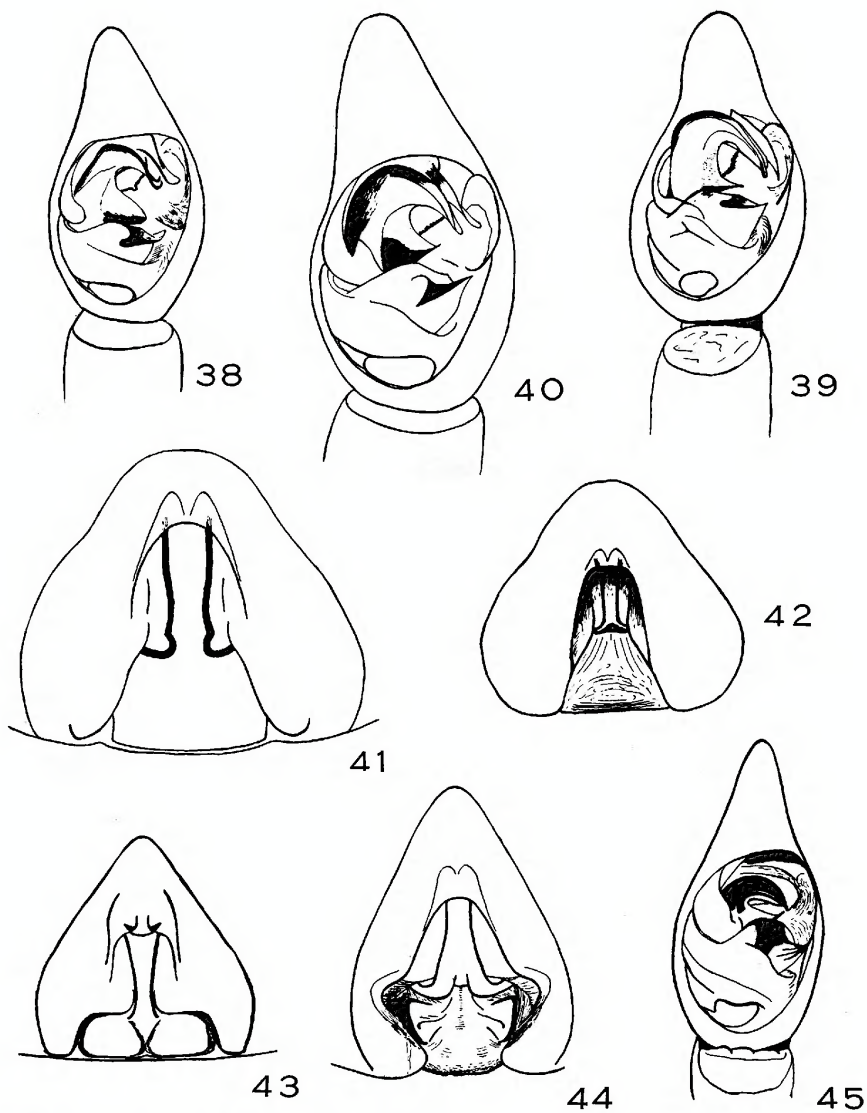
FEMALE.—Total length, 16.50 mm., not including the spinnerets.

Carapace and legs mainly yellow, the abdomen darker, grayish. Median light band of the cephalothorax narrowing in front of the dorsal groove and again behind the eyes, continued forward as a narrow band of white hairs between the posterior eyes and partly between the eyes of the second row. Parallel dark bands on each side of the median band slightly wider than the median band, extending from the posterior margin of the carapace to the clypeus, barely enclosing the eyes on each side. Sides with a narrow marginal dark band. All eyes more or less surrounded by a black area. Face marked with two dark stripes extending from the posterior median eyes to the chelicerae and enclosing the anterior laterals. Abdomen with a wide median dark band, almost black behind but extending forward from about the middle as two dark lines enclosing a brown area. A narrow light band on each side of the median dark band. Sides of the abdomen dark gray. From the dorsal aspect this species looks almost exactly like *Lycosa punctulata* Hentz, which is common in Florida, differing only in the shape of the median light band of the carapace, the occurrence of the brown area in the anterior half of the median dark band of the abdomen and the relative widths of the light bands on each side of the median dark band of the abdomen. Venter black, usually bearing ten spots of white hairs arranged in four rows of two each from front to back, with an additional one lateral to the third row on each side. Occasional examples have only six spots. Sternum black, the coxae of the legs dark beneath. Chelicerae, endites, the dorsum of the coxae, and trochanters reddish brown. Patellae, tibiae, and tarsi of the palpi, also metatarsi and tarsi of the legs, reddish brown. All femora gray beneath. Labium darker than the endites.

Carapace longer than broad (7.60 mm./5.60 mm.), 4.70 mm. high. Posterior eye quadrangle wider than long (24/18), the anterior eyes larger than the posteriors (8/7). Anterior row of eyes narrower than the second row (15/20), distinctly procurved, the eyes equal and equidistant. Clypeus less than half as high as the diameter of an anterior lateral eye. Chelicerae 3.10 mm. long, exclusive of the claw, 3.00 mm. wide. Lower margin of the furrow of the chelicera armed with three equal, medium-sized teeth, the upper margin with three unequal teeth, the median the largest. Labium as long as wide. Sternum longer than wide (30/25). Epigynum, figure 37. Spinnerets equal in length, the anterior pair somewhat stouter. Abdomen longer than wide (95/61).

Legs, 4123, all the tibiae armed beneath with three pairs of spines, the distal pair apical. Tibiae III and IV with proximal and submedian spines above. Tibia and patella I, 7.30 mm. long, IV, 7.90 mm. long.

RECORDS.—Five adult females (one of which is designated as the allotype) and one immature male from Levy County, Florida, April 28,



38. *Lycosa pulchra* (Keyserling), palpus.
 39. *Lycosa kochi* Emerton, palpus.
 40. *Lycosa huberti* Chamberlin, palpus.
 41. *Lycosa pulchra* (Keyserling), epigynum.
 42. *Lycosa kochi* Emerton, epigynum.
 43. *Lycosa huberti* Chamberlin, epigynum.
 44. *Lycosa euepignata* Montgomery, epigynum.
 45. *Lycosa euepignata* Montgomery, palpus.

1934, on an island about five miles from the town of Cedar Keys, captured at night with a headlight in reeds above the high tide mark. Many adult males and females collected in Monroe and Dade Counties, Florida, February 7, 1935 (J. Kilby, R. E. Bellamy and F. Blair). Several were also taken in the Everglades. They report this species as one of the commonest forms in the southern end of Florida. The allotype and other specimens are in the collection of The American Museum of Natural History.

The following four species are closely related and two of them, *Lycosa pulchra* Keyserling and *Lycosa kochi* Emerton, have been frequently confused. This has been due primarily to the nature of the original descriptions which are, for the most part, inadequate. Montgomery in 1902 discussed the situation and proposed to discard the name *gulosa* Walckenaer, the first name applied to one of these four species. Gertsch in 1934 (American Museum Novitates, No. 726, pp. 7-8) distinguished between the species but retained the name *gulosa*. In his revision of 1908, Chamberlin included three of these species under Walckenaer's name. It seems advisable at this time to review the situation again.

As a preface it may be stated that a study of the descriptions has convinced us that no description is in existence in which *kochi* and *pulchra* can be separated without the aid of figures of the male palpi or the female epigyna when these two species are considered throughout the range of their variations. The palpi and epigyna have been found to be constant in each species in all the specimens studied.

Walckenaer, in 1837, gave a very brief description, without figures, of *Lycosa gulosa* from North America. If he had given a definite locality, or if he had figured his species, it would not be difficult to place the name, providing, of course, that it was one of the two forms under consideration, which is far from certain. In the light of the confusion that has existed since then, it seems advisable to accept Montgomery's proposal to discard this name. In 1876 Keyserling described *Lycosa pulchra* in great detail. However, without his figure of the epigynum it would be a difficult task to distinguish between the two species in question. One is confined to the southeastern part of the United States and has been collected as far west as Texas and as far north as North Carolina. The other is more northern in its distribution, being common in the northern United States east of the Rocky Mountains and occurring along with the other species as far south as North Carolina. The species described by Keyserling, the type locality of which is simply the "United States," is

presumed to be the southern one and the figure of the epigynum seems to support this contention adequately. Emerton incorrectly identified and figured this northern species as *Lycosa kochi* (Keyserling). The figure of the male palp in his paper leaves no question as to the identity of the thing he was describing and, because Emerton placed it in another genus, the name becomes available and is used for the northern form in this paper. *Lycosa euepiggynata* Montgomery was synonymized with *gulosa* by Chamberlin in 1908, but it is quite distinct. The fourth species, *Lycosa huberti* Chamberlin, was described from the female, so a description and figure of the male palpus are included. These last two forms are perfectly distinct in the epigynum and the palpi and can scarcely be confused with the others. Figures of the palpi and epigyna of all four species are included for comparison.

***Lycosa kochi* Emerton**

Figures 39 and 42

Lycosa kochii EMERTON, 1885, Trans. Connecticut Acad. Arts and Sciences, VI, p. 485, Pl. XLVI, fig. 6. (Not *Tarentula kochi* Keyserling.)

Lycosa nigraurata MONTGOMERY, 1902, Proc. Acad. Nat. Sci. Philadelphia, p. 564, Pl. XXX, fig. 53.

Lycosa purcelli MONTGOMERY, 1902, idem, p. 566, Pl. XXX, figs. 30 and 31.

DISTRIBUTION.—United States and Canada east of the Rocky Mountains, south to North Carolina.

RECORDS.—Larchmont, N. Y., Sept. 11, 1932 (Gertsch). Baldwin, Long Island, N. Y., April 21, 1908. Ramsey, N. J., Sept. 16, 1934 (Gertsch). Near Englewood, N. J., April 30, 1933 (Gertsch). Norwalk, Connecticut, May and June, 1933 (Gertsch). Ann Arbor, Michigan (E. L. Miner). St. Croix Falls, Wisconsin, Nov., 1931 (Gertsch). St. Paul, Minnesota, June 4, 1932 (R. W. Macy). Minneapolis, Minnesota, June 1, 1932 (Gertsch). Wacouta Beach, Lake Pepin, Minnesota, May 15, 1932 (Gertsch). Darke County, Ohio (T. H. Hubbell). Montvale Springs, Tennessee, March 18, 1929 (W. M. Barrows). Sides of Mount Leconte, Sept. 8, 1928 (W. M. Barrows). Burlington, North Carolina (H. K. Wallace). Lake James, North Carolina (H. K. Wallace).

***Lycosa pulchra* (Keyserling)**

Figures 38 and 41

Tarentula pulchra KEYSERLING, 1876, Verh. K. K. Zool.-Bot. Gesell., Wien, XXVI, p. 628, Pl. I, figs. 13 and 14.

Lycosa insopita MONTGOMERY, 1904, Proc. Acad. Nat. Sci. Philadelphia, p. 280, Pl. XVIII, figs. 3 and 4.

RECORDS.—Austin, Texas (Montgomery). Florida (numerous examples from the central part). Burlington, North Carolina.

***Lycosa euepigynata* Montgomery**

Figures 44 and 45

Lycosa euepigynata MONTGOMERY, 1904, Proc. Acad. Nat. Sci. Philadelphia, p. 279, Pl. xvii, figs. 1 and 2.

DISTRIBUTION.—This species has been reported only from Texas.

***Lycosa huberti* Chamberlin**

Figures 40 and 43

Lycosa huberti CHAMBERLIN, 1924, Proc. U. S. National Museum, LXIII, pp. 28-29, Pl. vi, fig. 44.

MALE.—Total length, 9.50 mm., not including the spinnerets.

Integument of the carapace dusky, or chocolate brown, with a wide median light stripe that is constricted behind the posterior lateral eyes and again in front of the dorsal groove, narrowing behind the dorsal groove, the sides with a marginal light band. Head region darker than the remainder of the cephalothorax, the region around the eyes black. Dorsum of the abdomen light in front, with a brown hastate mark outlined in black, dusky gray behind and with indistinct chevrons. Sides dark or dusky gray, the anterolateral margins darker, almost black. Chelicerae deep reddish-brown. Venter dusky, without definite markings. Sternum and endites reddish brown, the labium darker. Coxae, trochanters, and femora of all legs with a yellowish cast, the patellae, tibiae, and metatarsi reddish brown, none of the joints annulate.

Carapace longer than broad (5.20 mm./4.00 mm.), 3.00 mm. high. Width of the face, 2.40 mm. Dorsal eye quadrangle wider than long (16/12), the anterior eyes larger than the posteriors (5/4). Anterior row of eyes narrower than the second (10/12), slightly procurved, the eyes about equidistant, the medians larger. Clypeus about as high as the diameter of an anterior median eye. Chelicerae as wide as long (2.00 mm./2.00 mm.). Lower margin of the furrow of the chelicera armed with three medium-sized teeth, equal in size and equally spaced. Specimens have been observed with only two teeth and one with a very small additional fourth tooth. Upper margin with three unequal teeth, unequally spaced, the median the largest. Labium as long as wide. Sternum longer than wide (24/19). Palpus, figure 40.

Legs, 4123, all tibiae armed beneath with three pairs of spines, the distal pair apical in position, armed above with a basal and middle spine on tibiae III and IV only. Tibia and patella I, 5.70 mm. long, IV, 5.70 mm. long.

FEMALE.—Total length, 12.00 mm., not including the spinnerets.

Color and markings similar to the male. Carapace longer than broad (5.10 mm./4.00 mm.), 3.00 mm. high. Width of the face, 2.60 mm. Posterior eye quadrangle wider than long (16/12), the anterior eyes larger than the posteriors (5/4). Anterior row of eyes narrower than the second row (10/12), procurved, the medians larger and slightly nearer the laterals than each other. Clypeus about as high as the diameter of an anterior median eye. Epigynum, figure 43.

Legs, 4123, spined as in the male. Tibia and patella I, 5.10 mm., IV, 5.50 mm. long.

RECORDS.—Alachua County, Florida, Jan. 16, 1933, male and female (H. K. Wallace). The male is designated as the allotype. Alachua County, Florida, April 17, 1934, female (H. K. Wallace).